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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,477	01/21/2005	Wenping Wu	10254.204-US	7706

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SUITE 1600  
NEW YORK, NY 10110

EXAMINER

RAGHU, GANAPATHIRAM

ART UNIT	PAPER NUMBER
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1652

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/500,477	Applicant(s) WU ET AL.	
	Examiner Ganapathirama Raghu	Art Unit 1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 14-24 is/are pending in the application.
- 4a) Of the above claim(s) 22-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/29/04</u> . | 6) <input checked="" type="checkbox"/> Other: <u>SEQ ALIGN</u> .                        |

### **DETAILED ACTION**

Claims 14-24 are pending in this application for examination. Claims 14-21 are now under consideration. Claims 22-24 are withdrawn as they are drawn to non-elected invention.

#### ***Election/Restrictions***

Applicant's election of Group I, claims 14-21, the species of endoglucanase and xylanase and SEQ ID NO: 2 and SEQ ID NO: 18 with traverse for prosecution in the reply filed on Oct. 23, 2006 is acknowledged. The traversal is on the grounds that the unity of invention exists between the restricted groups and all the claims are closely related and examination of all the claims will not pose a serious search burden.

Applicants arguments of 1). No lack of unity was found by the Examiner and 2). The claims are linked by a special technical feature, the method of treatment of vegetable proteins (Group II) and the method of improving the nutritional value of an animal feed are answered as follows.

1. The traversal is on the grounds that there was no lack of unity made in the international phase of the application. Applicant's arguments have been fully considered but are not deemed persuasive to withdraw the restriction requirement previously applied. With regard to the finding of unity of invention in the international phase, it is noted that even if the International Authority found unity of invention regarding the instant claims, according to 37 CFR 1.499, if the Examiner finds that the national stage application lacks unity of invention under 37 CFR 1.475, the Examiner may in an Office Action require the applicant in the response to that action to elect an invention to which the claims shall be restricted. Such requirement may be made before any

action at the discretion of the Examiner. Thus a finding of unity of invention in the international stage is not binding on the examination during national phase examination.

2. Applicant's argument of claims are linked by special technical feature is not persuasive because Hong et al., (PUBMED, Gene Accession No.: AY055121, publication date 23 Oct. 2001) disclose a polynucleotide sequence with 99% sequence homology to SEQ ID NO: 1 and 17 and encoding a polypeptide with endoglucanase activity that has 100% sequence homology to SEQ ID NO: 2 and 18. Therefore the technical features linking the inventions of Groups I-III does not constitute a special technical feature as defined by PCT Rule 13.2, as it does not define a contribution over the prior art. Further evidence that the claims lack special technical feature is found under 35 U.S.C. 103(a) below. Applicant further argues that there would be no undue burden on the Examiner to examine claims directed to methods of using elected composition. Searching the polypeptides and the method of use of the polypeptides are not coextensive. Group I polypeptides encompasses molecules which are claimed in terms of different percentage of sequence homology (70%-100%) and fragments of various enzymes with different activities and also from different sources i. e., microorganisms, the search of method of use of all the polypeptides as in group I would involve text search of all the claimed enzymes and would be burdensome and moreover said process or method of use can be carried out by polypeptides that are similar only in activity but from different source and may possess different structural features. Furthermore, at this stage of the prosecution it is premature to include the process for examination till the claims directed to the products become allowable. Therefore, for the above-cited reasons the request for the inclusion of Group II-III claims 22-24 are not considered and the requirement is still deemed proper and is therefore made FINAL.

***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). This application is a 371 of PCT/DK03/00039 filed on 01/23/2003 and claims the priority date of Denmark application 2002 00130 filed on 01/25/2002.

***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 06 June 2004 and is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner is considering the information disclosure statement.

***Objection: Abstract***

The abstract of the disclosure is objected to because it should be on a separate sheet of paper. Correction is required. See MPEP § 608.01(b).

***Claim Rejections: 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 16 and dependent claim 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 recites the phrase "... 75% identity to ...SEQ ID NO: 2 or ...SEQ ID NO: 18" the metes and bounds of the phrase is not clear and the examiner

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suggests changing the phrase to "...75% sequence identity to SEQ ID NO: 2 or ...SEQ ID NO: 18". Correction is required.

Claim 16 and claim 17 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 is indefinite in the recitation of stringent conditions, as the specification does not define what conditions constitute "low stringency". While page 20 of the specification indicates some conditions which are intended to be stringent, the conditions are merely exemplary and in the art what is considered stringent varies widely depending on the individual situation as well as the person making the determination. As such it is unclear how homologous to the sequence of a gene encoding a polypeptide sequence of SEQ ID NO: 2 or 18 a sequence must be to be included within the scope of these claims.

Claim 16 and claim 17 dependent therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 recites the phrase "... a complementary strand", it is not clear to the examiner whether the complementary polynucleotide claimed is full length or partial complement of the claimed sequence. Clarification and correction required.

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Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 17 recites the phrase “derived from a strain of *Aspergillus*, *Bacillus*, *Humicola*, *Thermomyces* or *Trichoderma* ...”. It is not clear to the examiner as to what the phrase “derived from a strain of *Aspergillus*, ...” means in the context of the above claim, is this synonymous with “obtained from a specific strain of *Aspergillus* ...” or does it include mutants thereof. Clarification is required.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 14 and claims 15-21 dependent therefrom are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 14-17 are directed to a composition comprising the elected thermostable enzymes having xylanase and endoglucanase activities, wherein preferably said endoglucanase has an amino acid sequence of at least 75% identity to amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 or is encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 or hybridizes to a subsequence comprising at least 100 nucleotides of SEQ ID NO: 1 or SEQ ID NO: 18 and having endoglucanase activity and xylanase from any source including

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recombinants, variants and mutants. Claims 18-21 are directed to said composition as a feed additive further comprising at least one fat soluble vitamin, water soluble vitamin and trace mineral. Claims 14-21 are rejected under this section 35 U.S.C. 112, because the claims are directed to a genus of polypeptides with no support in the specification for the structural details associated with the function i.e., endoglucanase activity and xylanase activity. No description of identifying characteristics of all of the sequences of an isolated polypeptide sequences in a composition comprising the elected thermostable enzymes having xylanase and endoglucanase activities, wherein preferably said endoglucanase has an amino acid sequence of at least 75% identity to amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 or is encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 or hybridizes to a subsequence comprising at least 100 nucleotides or a fragment of SEQ ID NO: 1 or SEQ ID NO: 18 and having endoglucanase activity and xylanase from any source including recombinants, variants and mutants has been provided by the applicants, which would indicate that they had possession of the claimed genus of the polypeptides i.e., with endoglucanase activity and xylanase activity. The specification is limited to the disclosure of a composition comprising an endoglucanase consisting of amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 and encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 s of SEQ ID NO: 17 from *Thermoascus auranticus* of the instant application or to a xylanase as described in of SEQ ID NO: 2 encoded by a polynucleotide of SEQ ID NO: 1 of WO 96/23062; Example 1-3 (In IDS) from *Thermomyces languiosus*. Therefore, one skilled in the art cannot reasonably conclude that



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applicant had possession of the claimed invention at the time the instant application was filed. Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at [www.uspto.gov](http://www.uspto.gov).

Claims 14-21 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a composition comprising an endoglucanase consisting of amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 and encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 of the instant application and a xylanase of SEQ ID NO: 2 encoded by a polynucleotide of SEQ ID NO: 1 as disclosed in WO 96/23062; Example 1-3 (In IDS) from *Thermomyces languiosus*, does not reasonably provide enablement for any composition comprising the elected thermostable enzymes having xylanase and endoglucanase activities, wherein said endoglucanase has an amino acid sequence of at least 75% identity to amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 or is encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 or hybridizes to a subsequence comprising at least 100 nucleotides of SEQ ID NO: 1 or SEQ ID NO: 18 and having endoglucanase activity from *Thermoascus auranticus* and xylanase from any source including recombinants, variants and mutants. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and or use the invention commensurate in scope with the claims.

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Factors to be considered in determining whether undue experimentation is required are summarized in *In re Wands* (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988)) as follows: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claim(s).

Claims 14-21 are so broad as to encompass for any composition comprising the elected thermostable enzymes having xylanase and endoglucanase activities, wherein said endoglucanase has an amino acid sequence of at least 75% identity to amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 or is encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 or hybridizes to a subsequence comprising at least 100 nucleotides of SEQ ID NO: 1 or SEQ ID NO: 18 and having endoglucanase activity from *Thermoascus auranticus* and xylanase from any source including recombinants, variants and mutants. The scope of the claims are not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polypeptides and encoding polynucleotides broadly encompassed by the claims. Since the amino acid sequence of a protein encoded by a polynucleotide determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires knowledge and guidance with regard to which amino acids in the protein's sequence and the respective codons in its polynucleotide, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in

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which the encoded proteins' structure relates to its function. However, in this case the disclosure is limited to a composition comprising an endoglucanase consisting of amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 and encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 of the instant application or to a xylanase of SEQ ID NO: 2 encoded by a polynucleotide of SEQ ID NO: 1 as disclosed in WO 96/23062; Example 1-3 (In IDS) from *Thermoascus aurantiacus*, but provides no guidance with regard to the making of variants and mutants or with regard to other uses. In view of the great breadth of the claims, amount of experimentation required to make the claimed polypeptides and encoding polynucleotides, the lack of guidance, working examples, and unpredictability of the art in predicting function from a polypeptide primary structure (e.g., see Ngo et al. in *The Protein Folding Problem and Tertiary Structure Prediction*, 1994, Merz et al. (ed.), Birkhauser, Boston, MA, pp. 433 and 492-495), the claimed invention would require undue experimentation. As such, the specification fails to teach one of ordinary skill how to use the full scope of the polypeptides encompassed by this claim.

While enzyme isolation techniques, recombinant and mutagenesis techniques are known, and it is not routine in the art to screen for multiple substitutions or multiple modifications as encompassed by the instant claim, the specific amino acid positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions or deletions.

The specification does not support the broad scope of the claims which encompass all modifications to an isolated endoglucanase polypeptide with SEQ ID NO: 2 from *Thermoascus auranticus* and any isolated polypeptide having xylanase activity from any source, because the specification does not establish: (A) regions of the protein/polynucleotide structure which may be modified without affecting the activity of encoded endoglucanase polypeptide or xylanase polypeptide; (B) the general tolerance of the polypeptide and the polynucleotide encoding endoglucanase polypeptide and the polynucleotide encoding xylanase to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any amino acid residue or the respective codon in the polynucleotide with an expectation of obtaining the desired biological function i.e., endoglucanase and xylanase activity; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claim broadly including endoglucanases and xylanases with an enormous number of modifications. The scope of the claim must bear a reasonable correlation with the scope of enablement (*In re Fisher*, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of polypeptides and encoding polynucleotides of endoglucanase polypeptide and xylanase polypeptide having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir, 1988).

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Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 16 recites a *Escherichia coli* DSM 14541 comprising the polynucleotide of SEQ ID NO: 1 encoding a polypeptide of SEQ ID NO: 2 strain deposited at the DSMZ-Deutsche Sammlung von Mikroorganism and Zellkulturen GmbH, Braunschweig, Germany, Date of Deposit: October 02, 2002 and given the following Deposit Accession number: DSMZ 14541.

It is apparent that *Escherichia coli* DSM 14541, Deposit Accession number: DSMZ 14541 is required to practice the claimed invention. As such the biological material must be readily available or obtainable by a repeatable method set forth in the specification, or otherwise readily available to the public. If it is not so obtainable or available, the requirements of 35 USC 112, first paragraph, may be satisfied by a deposit of the *Escherichia coli* DSM 14541. The specification does not disclose a repeatable process to obtain the organism and does not show that it is readily available to the public.

It is noted that applicants have deposited the organism but there is no indication in the specification as to the public availability. If a deposit was made under the terms of Budapest Treaty, then a statement, affidavit or declaration by Applicants, or a statement by an attorney of record over his/her signature and registration number, or someone empowered to make such a statement, stating that the invention will be irrevocably and without restriction released to the public upon the issuance of a patent, would satisfy the deposit requirement made herein. The

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applicant must submit a statement from a person to corroborate the fact, stating that the biological material specifically identified in the application as filed.

If the deposit has not been made under the Budapest Treaty, then in order to certify that the deposit meets the criteria set forth in 37 CFR 1.801-1.809 and MPEP 2402-2411.05, Applicant may provide assurance of compliance by statement, affidavit or declaration, or by someone empowered to make same, or by a statement by an attorney of record over his /her signature and registration number showing that:

- (a) during the pendency of the application, access to the invention will be afforded to the Commissioner upon request;
- (b) all restrictions upon availability to the public will be irrevocably removed upon granting the patent;
- (c) the deposit will be maintained in public depository for a period of 30 years, or 5 years after the last request or for the enforceable life of the patent, whichever is longer;
- (d) a test of the viability of the biological material at the time of deposit (see 37 CFR 1.807); and the deposit will be replaced if it should ever become inviable.

***Claim Rejections: 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al., (PUBMED, Gene Accession No.: AY055121, publication date 23 Oct. 2001), Hansen et al.,<sup>1</sup> (WO 96/23062, date of publication 08/01/1996), Hansen et al.,<sup>2</sup> (US Patent No.: 5,817,500 date of patent 10/06/1998), Fagerstrom et al., (US Patent No.: 5,922,579, date of publication 07/13/1999) and Paloheimo et al., (US Patent No.: 6,228,629 B1, date of patent 05/08/2001),. Claims 14-17 are directed to a composition comprising the elected thermostable enzymes having xylanase and endoglucanase activities, wherein said endoglucanase preferably has an amino acid sequence of at least 75% identity to amino acid residues 30-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 or is encoded by a polynucleotide comprising residues 1-1008 or 91-1008 of SEQ ID NO: 1 or 97-1008 of SEQ ID NO: 17 or hybridizes to a subsequence comprising at least 100 nucleotides or a fragment of SEQ ID NO: 1 or SEQ ID NO: 18 and having endoglucanase activity from *Thermoascus auranticus* and xylanase from any source including recombinants, variants and mutants. Claims 18-21 are directed to said composition as a feed additive further comprising at least one fat soluble vitamin, water soluble vitamin and trace mineral

Hong et al., (*supra*) disclose a polynucleotide sequence with 99% sequence homology to SEQ ID NO: 1 and 17 and encoding a polypeptide with endoglucanase activity that has 100% sequence homology to SEQ ID NO: 2 and 18 (see NCBI sequence information and annotation provided).

Hansen et al.,<sup>1</sup> (*supra*) disclose the polypeptide from *Thermoascus aurantiacus* (SEQ ID NO: 2) having xylanase activity and encoding polynucleotide sequence with SEQ ID NO: 1 comprised in the instant application composition.

Hansen et al.,<sup>2</sup> (*supra*) teach feed additives comprising a mono component xylanase including recombinant plasmids, vectors, host cells and method making the polypeptide.

Fagerstrom et al., (*supra*) teach xylanase enzyme compositions in combination with other enzymes including endoglucanase and the use of such compositions in various applications including as a feed additive.

Paloheimo et al., (*supra*) also teach xylanase enzyme compositions in combination with other enzymes including endoglucanase and the use of such compositions in various applications including as a feed additive.

The present invention relates to compositions comprising at least two thermostable enzymes selected from the group consisting of: Endoglucanase, xylanase and also relates to methods of preparing such compositions, their use in animal feed, their use for treatment of vegetable proteins, as well as animal feed compositions with content thereof.

Combining the teachings of the above references as all the cited references teach every element of the instant invention, it would have been obvious to one of ordinary skill in the art at the time of the instant invention to develop a compositions comprising at least two thermostable



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enzymes selected from the group consisting of: Endoglucanase, xylanase. One of ordinary skill in the art would have been motivated to make or use such a composition for various industrial use. One of ordinary skill in the art would have had a reasonable expectation of success, since the references of Hong et al., and Hansen et al.,<sup>1</sup> cited above teach the isolation of two thermostable enzymes endoglucanase and xylanase respectively including the method of making the polypeptide and the references of Hansen et al.,<sup>2</sup>, Fagerstrom et al., and Paloheimo et al., teach the preparation and use of compositions comprising various enzymes including endoglucanase and xylanase and their use as feed additives.

Therefore, the above references render claims 14-21 *prima facie* obvious to one of ordinary skill in the art.

### ***Conclusion***

None of the claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ganapathirama Raghu whose telephone number is 571-272-4533. The examiner can normally be reached on 8 am - 4.30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy can be reached on 571-272-0928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of the application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR-system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Ganapathirama Raghu, Ph.D.

Patent Examiner

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Nov. 08, 2006.



REBECCA E. PROUTY  
PRIMARY EXAMINER  
GROUP 1600  
1600



**Nucleotide**

PubMed

**Nucleotide**

Protein

## Genome

## Structure

PMC

## Taxonomy

OMIM

## Books

Search   for

## Limits

[Preview/Index](#)

## History

## Clipboard

## Details

Display **GenBank**  Show **5**  Send to  Hide: ☐ Sequence ☐ Lesser features

Range: from  to  ☐ Reverse complemented strand Features:

1: AY055121. Reports *Thermoascus aurantiacus* [gi:16356670]

Link:

Features	Sequence
<ul style="list-style-type: none"> <li>• <b>Feature 1:</b> [Description]</li> <li>• <b>Feature 2:</b> [Description]</li> <li>• <b>Feature 3:</b> [Description]</li> <li>• <b>Feature 4:</b> [Description]</li> <li>• <b>Feature 5:</b> [Description]</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Sequence 1:</b> [Description]</li> <li>• <b>Sequence 2:</b> [Description]</li> <li>• <b>Sequence 3:</b> [Description]</li> <li>• <b>Sequence 4:</b> [Description]</li> <li>• <b>Sequence 5:</b> [Description]</li> </ul>

LOCUS AY055121 1262 bp mRNA linear PLN 23-OCT-2001

DEFINITION *Thermoascus aurantiacus* strain IFO 9748 endo-beta-1,4-glucanase (ENG1) mRNA, complete cds.

ACCESSION AY055121

VERSION AY055121.1 GI:16356670

## KEYWORDS

SOURCE            Thermoascus aurantiacus

ORGANISM	Thermoascus aurantiacus
----------	-------------------------

Eukaryota; Fungi; Ascomycota; Pezizomycotina; Eurotiomycetes;  
Eurotiales; Trichocomaceae; Thermoascus.

REFERENCE 1 (bases 1 to 1262)

AUTHORS    Hong, J., Tamaki, H. and Kumagai, H.

TITLE Cloning of a endo-beta-1,4-glucanase from *Thermoascus aurantiacus*  
 IFO 9748

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 1262)

AUTHORS    Hong, J., Tamaki, H. and Kumagai, H.

TITLE Direct Submission

JOURNAL Submitted (10-SEP-2001) Graduate School of Agriculture, Kyoto University, Kitasiragawa, Kyoto 606-8052, Japan

FEATURES	Location/Qualifiers
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421 cgatcctcat aactacggca gatactacaa ttctataatc tcgagccctt ccgatttcca  
481 gaccttcttg aaaacggtcg cctcacagtt tgcttcgaat ccactgggtca tcttcgacac  
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661 gaccggggca tggacctgga cgaacgtgaa cgataacatg aaaagcctga ccgacccatc  
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781 gacctgcgta tcttcgacca tcggtcaaga gcgaatcacc agcgcaacgc agtggctcag  
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1261 gc

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[NCBI](#) | [NLM](#) | [NIH](#)

Sep 27 2006 15:22:0

QY 601 ACCGGGGGATGGAACCTGGAGCAAGCTGAACGATTAACATGAAAGCCCTGACCGACCATCT 660  
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 DB 722 GACAAGATCATATATACGAGATGCAACCAATGACCTGACCTGACCGATCCGGGACATCAACG 781  
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RESULT 3  
 LOCUS AY055121 1262 bp mRNA linear PLN 11-MAY-2004  
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 ACCESSION AY055121  
 VERSION AY055121.1 GI:16356670

KEYWORDS Thermoascus aurantiacus

SOURCE Thermoascus aurantiacus

ORGANISM Thermoascus aurantiacus

REFERENCE 1 (bases 1 to 1262)

AUTHORS Hong, J., Tamaki, H., Yamamoto, K. and Kumagai, H.

TITLE Cloning of a gene encoding a thermo-labile endo-beta-1,4-glucanase

JOURNAL from Thermoascus aurantiacus and its expression in yeast

REFERENCE Biochemol. Lett. 25 (8), 657-661 (2003)

AUTHORS 12882162

JOURNAL 2 (bases 1 to 1262)

REFERENCE Hong, J., Tamaki, H. and Kumagai, H.

AUTHORS Direct Submission

TITLE Submitted (10-SEP-2001) Graduate School of Agriculture, Kyoto

JOURNAL University, Kitasiragawa, Kyoto 606-8052, Japan

REFERENCE Location/Qualifiers

AUTHORS 1. 1262

TITLE /organism="Thermoascus aurantiacus"

JOURNAL /mol\_type="mRNA"

REFERENCE /strain="IFO 9748"

AUTHORS /db\_xref="taxon:5087"

TITLE 1. 1262

JOURNAL /gene="egi"

REFERENCE /gene="egi"

AUTHORS /note="endo-beta-1,4-glucanase; cellulase; member of GH5"

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 Matches 1002; Conservative 0; Mismatches 6; Indels 0; Gaps 0;

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 QY 901 ATCTGCTGGCGCGCGCGCGCTGCTGCTGAGGAGACTACATATCTCCATGAGCGCGCAAT 960  
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QY 301 IMAAGPWWGDYIFSMEDPNDGIAVQOILPILTPYL 335  
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RESULT 2

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AC 08TG26;  
DT 01-JUN-2002, integrated into UniProtKB/TrEMBL.  
DT 01-MAR-2003, sequence version 2.  
DT 07-FEB-2006, entry version 15.  
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GN Name=egl1;  
OS Thermosaurus aurantiacus.  
OC Eukaryota; Fungi; Ascomycota; Pezizomycotina; Eurotiomycetes;  
OC Eurotiiales; Trichocomaceae; Thermosaurus.  
NCBI\_Taxid=5087;  
[1]

NUCLEOTIDE SEQUENCE.  
RP MEDLINE=22764646; PubMed=12882162; DOI=10.1023/A:1023072311980;  
RA Hong J., Tamaki H., Yamamoto K., Kumagai H.;  
RT "Cloning of a gene encoding a thermo-stable endo-beta-1,4-glucanase  
from Thermosaurus aurantiacus and its expression in yeast.";  
RL Biotechnol. Lett. 25:657-661 (2003).  
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CC EMBL; AF487830; AAL88714.2; -; Genomic DNA.  
CC PDB; 1GZJ; X-ray; A/B=32-335.  
DR PDB; 1H1N; X-ray; A/B=31-335.  
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DR GO; GO:0005975; P:carbohydrate metabolism; IEA.  
DR InterPro; IPR001547; Glyco\_hydro\_5.  
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SQ SEQUENCE 335 AA; 36932 MW; 36E5C6961397EB6 CRC64;

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DB 121 DPHNYGRYNSIISPSDFQTFWKTVAQFASNPVLFDTNNEHYHMDQTLVNLNOAI 180  
QY 121 DPHNYGRYNSIISPSDFQTFWKTVAQFASNPVLFDTNNEHYHMDQTLVNLNOAI 180  
DB 121 DPHNYGRYNSIISPSDFQTFWKTVAQFASNPVLFDTNNEHYHMDQTLVNLNOAI 180  
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DB 181 DGIRSAAGTQYIFVEGNSWTGAMTWNVNDNKSITDPSDKIIEYMAQYLDSDSGTSA 240  
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QY 301 IMAAGPWWGDYIFSMEDPNDGIAVQOILPILTPYL 335  
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ID 096U15 THEAU PRELIMINARY; PRT; 335 AA.  
AC 096U15;  
DT 01-DEC-2001, integrated into UniProtKB/TrEMBL.  
DT 01-DEC-2001, sequence version 1.

DT 07-FEB-2006, entry version 15.  
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GN Name=egl1;  
OS Thermosaurus aurantiacus.  
OC Eukaryota; Fungi; Ascomycota; Pezizomycotina; Eurotiomycetes;  
OC Eurotiiales; Trichocomaceae; Thermosaurus.  
NCBI\_Taxid=5087;  
[1]

NUCLEOTIDE SEQUENCE.  
RP MEDLINE=22764646; PubMed=12882162; DOI=10.1023/A:1023072311980;  
RA Hong J., Tamaki H., Yamamoto K., Kumagai H.;  
RT "Cloning of a gene encoding a thermo-stable endo-beta-1,4-glucanase  
from Thermosaurus aurantiacus and its expression in yeast.";  
RL Biotechnol. Lett. 25:657-661 (2003).  
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CC EMBL; AY055121; AAL16412.1; -; mRNA.  
CC HSSP; 08TG26; 1GZJ.  
DR SMR; 08TG26; 1GZJ.  
DR GO; GO:0004553; F:hydrolyase activity, hydrolyzing O-glycosyl . . .; IEA.  
DR GO; GO:0005975; P:carbohydrate metabolism; IEA.  
DR InterPro; IPR001547; Glyco\_hydro\_5.  
DR Pfam; PF00150; Cellulase; 1.  
SQ SEQUENCE 335 AA; 36951 MW; 607DE84BBB19A750 CRC64;

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Best Local Similarity 99.4%; Score 1772; DB 2; Length 335;  
Matches 333; Conservative 0; Mismatches 2; Indels 0; Gaps 0;

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QY 61 WPDNTIDTLISKNNIFRVPFMERLVNPSMTGSPDNYLADLIATVNAITQGAAYAV 120  
DB 61 WPDNTIDTLISKNNIFRVPFMERLVNPSMTGSPDNYLADLIATVNAITQGAAYAV 120  
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DB 121 DPHNYGRYNSIISPSDFQTFWKTVAQFASNPVLFDTNNEHYHMDQTLVNLNOAI 180  
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DB 181 DGIRSAAGTQYIFVEGNSWTGAMTWNVNDNKSITDPSDKIIEYMAQYLDSDSGTSA 240  
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RESULT 4

ID 04MM09 ASPFU PRELIMINARY; PRT; 397 AA.  
AC 04MM09;  
DT 05-JUL-2005, integrated into UniProtKB/TrEMBL.  
DT 05-JUL-2005, sequence version 1.  
DT 07-MAR-2006, entry version 6.  
DE Endoglucanase, putative.  
GN ORName=Afu6g1600;  
OS Aspergillus fumigatus (Sartorya fumigata).  
OC Eukaryota; Fungi; Ascomycota; Pezizomycotina; Eurotiomycetes;  
OC Eurotiiales; Trichocomaceae; mitosporic Trichocomaceae; Aspergillus.  
NCBI\_Taxid=5085;  
[1]  
NUCLEOTIDE SEQUENCE [LARGE SCALE GENOMIC DNA].  
RP STRAIN=AT293 / CBS 101355 / FGSC A1100;

gene  
CDS

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Db	122	CTCGCAGACAGAAAGCAGAGAGCCAGGCTGCCAAAGTATTCAAATGCTTCGATTCGAA	181
QY	121	GAGTCCGGGTGTGAATTCGGAAGCAGAACCTTCAGAGAGTCGAGGGAAGAGATTATATA	180
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QY	181	TGGCTGTATCCCAACACCATTTGACACATTTGATCAGACGAGGGATGAACATCTTCGTGTC	240
Db	242	TGGCTGTATCCCAACACCATTTGACACATTTGATCAGACGAGGGATGAACATCTTCGTGTC	301
QY	241	CCCTTTATGATGAGAGATTGGTTCCTCCACTGAATGACGGCTCTCGGATCCGAACTAC	300
Db	302	CCCTTTATGATGAGAGATTGGTTCCTCCACTGAATGACGGCTCTCGGATCCGAACTAC	361
QY	301	CTGGCAGATCTCAGATAGGACCTGTAAATGCAATCACCCAGAAAGGTGCTACGCGCTGTC	360
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QY	361	GATCCTGATATCTACGCGCAGATACTACAATTCATATATCTCGAGCCCTTCGATTTCCAG	420
Db	422	GATCCTGATATCTACGCGCAGATACTACAATTCATATATCTCGAGCCCTTCGATTTCCAG	481
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QY	481	AATTAAGCAATACCAAGCATATGAGACCAAGCTTAGTCTCAATCTCAAACAGCGCGCTATC	540
Db	542	AATTAAGCAATACCAAGCATATGAGACCAAGCTTAGTCTCAATCTCAAACAGCGCGCTATC	601
QY	541	GACGGCATGCGTTCGCGCGGAGGCCACTTCCAGATACCTTTGTGAGGGCAATTCGTGG	600
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QY	601	ACCGGGCATGGAACCTGAGCGAAGCTGAGCGATTAACATGAAGAACCTGACCGAACCTCT	660
Db	662	ACCGGGCATGGAACCTGAGCGAAGCTGAGCGATTAACATGAAGAACCTGACCGAACCTCT	721
QY	661	GACAGATCATTAACGAGATGCAACAGATCTTGAACCTTGAAGGATTCGGGACATCAAGC	720
Db	722	GACAGATCATTAACGAGATGCAACAGATCTTGAACCTTGAAGGATTCGGGACATCAAGC	781
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QY	781	GCCAAACGGGAAGAAAGGCATCATCGGCGAGTTTGGCGGGCGAGCCACAACACGCTTCGAG	840
Db	842	GCCAAACGGGAAGAAAGGCATCATCGGCGAGTTTGGCGGGCGAGCCACAACACGCTTCGAG	901
QY	841	ACGGCCATCAACGGGCAATGCTGAGCTACATAGCCCAAGACACAGAGCTTGAATGAGCGCC	900
Db	902	ACGGCCATCAACGGGCAATGCTGAGCTACATAGCCCAAGACACAGAGCTTGAATGAGCGCC	961
QY	901	ATCTGGTGGCGGCGCGGCGCTGGTGGGGAGACTAATTTCTCCATGAGCCGGAACAT	960
Db	962	ATCTGGTGGCGGCGGCGCTGGTGGGGAGACTAATTTCTCCATGAGCCGGAACAT	1021





